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REPORT OF THE SECOND JOINT CCI/CBS MEETING ON THE GCOS SURFACE NETWORK

(De Bilt, The Netherlands, 25-27 June, 1997)

August 1997

GCOS - 35

WMO/TD No. 839

WORLD METEOROLOGICAL
ORGANIZATION

INTERGOVERNMENTAL
OCEANOGRAPHIC COMMISSION

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GENERAL SUMMARY OF THE WORK OF THE MEETING

1. ORGANIZATION OF THE MEETING

1.1 Opening Remarks

Mr H. Daan (The Netherlands) welcomed the participants to the Royal Netherlands Meteorological Institute and provided practical information on the conduct of the meeting. Dr E. Sarukhanian welcomed the participants on behalf of the Secretary-General of WMO and provided some background information on the development of the GSN. He pointed out that the task for this CCI/CBS expert group was to review comments, provided by the CBS Working Group on Observations (WG/OBS) and by WMO Members, on the proposed list of 1000 stations, to recommend the next steps in the establishment of the network and to consider how the quality control and monitoring of the network could be implemented on a global or regional basis.

The list of participants is given in Annex A.

1.2 Election of the Chairman

Mr F. Zbar (USA) was elected to chair the meeting.

1.3 Adoption of the Agenda

The provisional agenda was adopted as given in Annex B.

2. REVIEW OF THE COMMENTS OF THE WORKING GROUP ON OBSERVATIONS AND WMO MEMBERS

2.1 Correspondence with WMO Members

Dr Fons Baede (The Netherlands), Rapporteur on GCOS matters, submitted his report on behalf of the CBS Working Group on Observations including replies from the Rapporteurs on Regional Aspects of the GCOS, representatives of CBS Lead Centres on Land Surface Observations and replies from 70 WMO Members who had responded to the WMO circular letter. This letter had been distributed on 21 March 1997 to 175 WMO Members requesting comments on the proposed list of 1000 stations, with particular emphasis on those within their own area of responsibility. Additional responses had been received since bringing the total to 83. Due to recent informal contacts, future responses are expected before the end of July 1997. Despite the expectation of additional responses, the group felt that a reminder letter should be sent to those WMO Members who have stations in the proposed GSN list and have not yet responded. This letter should remind WMO members of the expected commitment to exchange data routinely on the GTS using the monthly CLIMAT message format and to agree to provide the historical climate data and metadata¹ for designated sites in their country. It was decided that a letter should also be sent to a few countries such as China, Spain, Eritrea and Kazakhstan requesting clarification on the early responses.

Some country responses raised the appropriateness of using data from automatic stations in their surface networks. In this regard, the experts recognized the inevitability of increased deployments of automated instrumentation for surface networks. The importance of having a suitable period of overlap of manual and automatic observations to quantify the

¹Metadata is a term used in climatology which is broadly defined as data or information describing climate data, particularly how the data were observed, processed and catalogued which can include for example the date, place, type of meteorological observation or set of observations, parameters observed, format, type of instrumentation used and history of the observing site

biases between the two procedures was stressed. Automation was, however, not considered to be a significant problem for the measurement of temperature and atmospheric pressure, the two parameters identified as the most important for the analysis of global climate change. While there are significant problems in automatically measuring precipitation, the low density of the GSN network is inadequate for precipitation analyses anyway. The experts noted and emphasized the importance of developing procedures to use a composite of in *situ* and remotely sensed observations for the analysis of precipitation.

Several countries did not accept, at the current time, the use of cooperative stations² specified in the initial selection because they could not operationally commit to making the data available as CLIMAT messages on a routine operational basis. The possibility of substituting other stations in the area such as those providing CLIMAT messages was proposed and accepted by the group. Such substitutions should be considered provisional in the hope that the data from these countries' cooperative stations may eventually be operationally supported.

One problem that was noted in reviewing the responses was the decreasing availability of observations from the polar regions of the globe, especially the Antarctic. In view of the importance of these polar observations, the meeting recommended that some countries such as Argentina, Germany, Ukraine be asked to confirm their decisions on the designation of Antarctic stations in the GSN. Furthermore, collaborative efforts between relevant countries should be encouraged to install and maintain automatic observing systems at locations where manual observation programmes had been curtailed.

2.2 Considering the Comments of WMO Members

The meeting agreed that the three experts on network design (H. Daan, T. Peterson, P. Jones) responsible for documentation and implementation procedures for the initial specification of the network, be further responsible for reviewing and refining the list of stations taking into consideration the comments of Members and guidance provided by this meeting. The group began its task at the meeting, taking a first cursory look at those responses available. Subsequent discussions resulted in the following guidelines to be used in deciding which stations should be proposed as the final selection for the network when reviewing the Members' responses:

- to accept those stations originally specified, including those with existing or planned automatic observation systems (unless otherwise specified in the responses by Members);
- to consider all proposed changes and additions, including additions from countries not having any designated station, and decide on their inclusion based on the quality of the data and the desired density of the network, including the overall spacing in neighbouring countries;
- to consider proposing to the Member(s) the inclusion of those stations which routinely transmit CLIMAT messages if the number of stations confirmed by countries concerned is insufficient;
- to accept all the suggested changes in station descriptive metadata.

²Many countries operate networks where the instruments are supplied by the meteorological service but the observations are made by a volunteer. These cooperative stations often take observations only once per day. Cooperative stations commonly observe only a limited number of variables, such as maximum and minimum temperature and precipitation.

2.3 Promoting Best Practices in the Operation and Management of the GSN

Following the precedent set in establishing the GCOS Upper Air Network (GUAN), the meeting proposed that a number of "best practices" be identified and associated with the agreed GSN station list to help ensure the highest possible standard of data quality and availability for the GSN. Such best practices for participating countries should include the following:

- transmitting monthly CLIMAT reports routinely in an accurate and timely manner;
- carefully archiving and preserving observational data and related metadata in both original and digital form within the country of origin;
- ensuring that the designated GSN data depository has an up-to-date digital copy of the historical climate data and all types of metadata for GSN stations;
- ensuring a sufficiently long period of observational overlap at the site in cases of significant changes in sensor devices or station location; and
- accurately calibrating any automatic instrumentation and participating in any intercomparison tests of such equipment.

It was further proposed that CCI and CBS may wish to review and consider expanding upon these "best practices" and incorporating them into appropriate manuals and guides.

3. DEVELOPMENT OF MONITORING PROCEDURES FOR THE GSN

The meeting considered it essential that the operational exchange of GSN temperature and pressure data via CLIMAT messages on the GTS be monitored routinely, focussing primarily on the availability of reports, including timeliness, and their quality. Some of the anticipated problems that would need to be addressed in monitoring the reports on the GTS include: absence of a report; late reports; error in the magnitude of one or more parameters; garbled messages; coding mistakes; and use of the old code instead of the new one. The experts recognized two levels of monitoring: long-term recurring problems that could be addressed through official WMO channels and shorter-term problems which could be best rectified informally.

The group examined the existing CBS Lead Centre monitoring mechanism as a possibility for monitoring CLIMAT messages. A concise description of how the CBS lead-centre approach works is given in Annex C. Despite the effectiveness of this approach in the monitoring of daily synoptic messages, the lead centres were not considered to be adequately equipped to carry out the monitoring of CLIMAT messages. It was therefore proposed that a modification of this approach be considered for monitoring CLIMAT messages for GSN stations.

Following the effective WWW lead centre monitoring procedures to effect remedial action for near-term problems, the experts proposed informal contact with appropriately identified focal points in each country involved in operating GSN stations. Depending on the circumstances in each country, these focal points may or may not be the same person as identified for the WWW monitoring process.

In view of the manageable size of the GSN (1000 stations) and the monthly frequency of reports, the meeting felt that it would be preferable to have one lead centre, possibly with a back-up centre, to do this monitoring. The group strongly recommended that the lead centre(s) be selected from a number of existing climate centres currently involved in the use and monitoring of CLIMAT messages such as: the Climate Prediction Centre in Washington DC,

USA, the National Climatic Data Centre in Asheville, North Carolina, USA, the Hadley Centre in Bracknell, UK, the National Climate Centre in Melbourne, Australia, the Japan Meteorological Agency in Tokyo, Japan, the National Climate Centre in Beijing, China, the Division for International Data Centres in Offenbach, Germany and the Institute for Global Climate and Ecology in Moscow, Russian Federation. The group thought it appropriate for CCI to follow-up on this discussion at its upcoming twelfth session (Geneva, 4-14 August 1997), with the goal of identifying centres interested in volunteering for such a task.

An issue was raised of the possible involvement of the climate centre designated as the depository for the historical climate data and metadata for GSN stations to be an archiving centre for climate data, but it was agreed that this task was outside the terms of reference of this expert group. It was suggested instead that this matter be considered by GCOS and CCI.

4. FUTURE STEPS IN THE IMPLEMENTATION OF THE GSN

The meeting agreed that the most important first step in the implementation of the GSN was a letter to WMO Members informing them of the formal establishment of the GSN. The letter should include:

- The final GSN list;
- A request that CLIMAT messages be routinely transmitted every month and that the historical climate data and related metadata be made available for each confirmed station in the country;
Information on "best practices" to be implemented at GSN stations;
Encouragement to include stations submitted to their national reference climatological stations network;
- A request to provide information for updating WMO-No. 9, Volume A;
Instructions for changing or updating the GSN;
An explanation of how to get information on the status of the network and on the availability of data from all stations in the GSN and the GUAN routinely through the World Wide Web and periodically through WMO Operational Newsletters.

It was subsequently proposed and agreed that those stations which have been selected for inclusion in the GSN but do not meet one or more of the basic requirements of confirmation, CLIMAT message distribution, and availability of historical climate data and metadata, be designated as provisional stations.

An updated implementation schedule was prepared and discussed and is given in Annex D.

5. RECOMMENDATIONS

The meeting recommended that:

- (a) A reminder letter be sent to all those Members with designated GSN stations who have not yet responded to the original circular letter.
- (b) Those Members who were not able to make commitments regarding high quality cooperative stations for the network be encouraged to find ways to include them in the future.
- (c) Members be encouraged to increase the number of GSN stations in the polar regions, especially the Antarctic.

- (d) CCI and Regional Associations be invited to make it clear that historical climate data and metadata from GSN stations should be considered with the CLIMAT reports as essential data, in accordance with Resolution 40 (Cg-XII), being necessary to provide a good representation of climate and to support WMO Programmes.
- (e) The availability and quality of CLIMAT messages distributed over the GTS be carefully monitored and that CCI should consider the lead centre concept as outlined in Section 3 for feasibility and implementation.
- (f) All suggested corrections to station descriptive metadata be used to update such information contained in WMO-No. 9, Volume A, and that the CBS Working Group on Data Management seek a more effective process to update this information.
- (g) A Web site be established to provide information on the status of the implementation of the GUAN and the GSN including current lists of stations by WMO Region and providing links to the appropriate depository(s) for the historical climate data and related metadata for all designated stations.
- (h) Procedures be established for making changes and updating the GSN and for informing all users of changes by taking advantage of the established Web site and WMO operational newsletters.
- (i) CBS and CCI collaborate closely in the development and implementation of "best practices" for the operation and maintenance of the GSN and that appropriate WMO manuals and guides be updated accordingly.

6. CLOSURE OF THE MEETING

Following expressions of appreciation to the representatives and staff of the Royal Netherlands Meteorological Institute for providing excellent facilities, the meeting was closed at 1300 hrs on Friday, 27 June 1997.

LIST OF PARTICIPANTS

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AGENDA

1. ORGANIZATION OF THE MEETING
 - 1.1 Opening Remarks
 - 1.2 Election of the Chairman
 - 1.3 Adoption of the Agenda

 2. REVIEW OF THE COMMENTS OF THE WORKING GROUP ON OBSERVATIONS AND WMO MEMBERS
 - 2.1 Correspondence with WMO Members
 - 2.2 Considering the Comments of WMO Members
 - 2.3 Promoting Best Practices in the Operation and Management of the GSN

 3. DEVELOPMENT OF MONITORING PROCEDURES FOR THE GSN

 4. FUTURE STEPS IN THE IMPLEMENTATION OF THE GSN

 5. RECOMMENDATIONS

 6. CLOSURE OF THE MEETING
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Extract from the Manual on GDPS

WMO-No. 485, Attachment 11.14

QUALITY OF OBSERVATIONAL DATA

20. Centres with global, hemispheric or near-hemispheric models should monitor the quality of one or more of the main types of observations using techniques such as those listed in Table E. Statistics should be compiled separately for each land station by station index number, for each ship or aircraft by call sign, for each buoy by identifier, and for each satellite by identifier, and for various geographic areas and levels in the atmosphere.

21. The centres should analyse the results and produce in an agreed format lists of observations believed to be consistently of low quality, together with information on which element of the observation (pressure, temperature, etc.) is thought to be of low quality and the evidence for considering it as such. These lists should be based on data received over one month and should be exchanged monthly between participating centres.

22. For each type of observation a lead centre shall be nominated from time to time by the president of CBS. The lead centre should liaise with the participating centres to coordinate all the monitoring results of that observation type and to define common methods and criteria to be used for compiling the monthly statistics. The lead centre should draw the attention of appropriate focal points where they have been identified and of the WMO Secretariat to obvious problems as they are detected. It should also produce every six months a consolidated list of observations of the relevant observation type believed to be of consistently low quality. Information on problems with observing systems, as well as individual observations, should also be included. When compiling the consolidated lists of suspect stations the lead centres should be rigorous so as to identify only those stations where they are confident that the observations are of consistently low quality. They should state which elements of the observation are considered of low quality and provide as much information as possible identifying the problem. The list should be passed on to the participating centres and to the WMO Secretariat. Where focal points have not been identified the Secretariat should notify Members of agencies responsible for the observations which appear to be of low quality, and request them to make an investigation with a view to identifying and correcting any possible cause of error. Members should be asked to reply within a fixed period of time, reporting on any remedial action and stating if any assistance is required. Monitoring results including follow-up action should be made available to CBS, the Executive Council and Congress. In the case of enquiries made by WMO, feedback to the lead centres is requested.

ATTACHMENT II. 14

TABLE E

Techniques for monitoring the quality of observations

1. **Compilation of statistics on the difference between observed values and the analysis and first-guess field:**
 2. **Compilation of statistics on observations which fail the routine quality-control checks;**
 3. **Examination of time series of observations from a particular station (particularly useful in data-sparse areas);**
 4. **Compilation of statistics on the differences between reported values of geopotential height and geopotential height recalculated from significant level data for radiosonde stations, using common formulae for all stations;**
 5. **For surface stations which report both mean sea-level pressure and station-level pressure, compilation of statistics on differences between reported mean sea-level pressure and mean sea-level pressure recomputed from reported station-level pressure and temperature and published values of station elevation;**
 6. **Compilation of co-location statistics.**
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Update schedule for establishment of the GSN

By 15 July 1997	Letter-reminder to Members who have not responded, and letters to Argentina, China, Eritrea, Kazakhstan, Spain and Ukraine requesting further information (deadline for responses by 15 August 1997)
15 July 1997 (Japan)	Submission of report of Expert Meeting on the GSN (EM/GSN) to Joint Data Management information Panel
4-14 August 1997 (Geneva)	Submission of recommendations of Expert Meeting to CCI-XII
10 August 1997	Update version of Baede's report to be sent to Chairman of AOP by Chairman WG/OBS
18 August 1997 (Reading, UK)	Submission of Baede's report and report of EM/GSN to AOP session
By September 1997	Members' replies to be sent to a small group of experts
25 September 1997 (The Netherlands)	Information on status of the establishment of GSN to be presented at GCOS JSTC-VII by Chairman of AOP
27-31 October 1997 (Geneva)	Submission of report of EM/GSN to the seventh session of CBS/WG/OBS
By November 1997	Finalization of the list of GSN stations by small group of experts
November 1997	Endorsement of list of GSN by Chairman of JSTC and approval of lists of GSN and GUAN by presidents of Regional Associations
December 1997	Follow-up letter to WMO Members on establishment of the GSN including final list of GSN stations List of GSN and GUAN stations to be put on World Web Site

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Footnote

Certain dates identified above correspond to meetings at which it is important that GSN finalization and implementation be discussed.

LIST OF GCOS PUBLICATIONS

- GCOS-1**
(WMO/TD-No. 493) Report of the first session of the Joint Scientific and Technical Committee for GCOS (Geneva, Switzerland, April 13-15, 1992)
- GCOS-2**
(WMO/TD-No. 55 1) Report of the second session of the Joint Scientific and Technical Committee for GCOS (Washington DC, USA, January 11-14, 1993)
- GCOS3**
(WMO/TD-No. 590) Report of the third session of the Joint Scientific and Technical Committee for GCOS (Abingdon, UK, November 1-3,1993)
[ftp://www.wmo.ch/Documents/gcos/jstc-3.txt]
- GCOS-4**
(WMO/TD-No. 637) Report of the fourth session of the Joint Scientific and Technical Committee for GCOS (Hamburg, Germany, September 19-22, 1994)
[ftp://www.wmo.ch/Documents/gcos/jstc-4.txt or /jstc-4.wp5]
- GCOS-5**
(WMO/TD-No. 639) Report of the GCOS Data System Task Group (Offenbach, Germany, March 22-25, 1994)
[ftp://www.wmo.ch/Documents/gcos/dstg.txt or /dstg.wp5]
- GCOS-6**
(WMO/TD-No . 640) Report of the GCOS Atmospheric Observation Panel, first session (Hamburg, Germany, April 25-28, 1994)
[ftp://www.wmo.ch/Documents/gcos/aop-1.txt or /aop-1.wp5]
- GCOS-7**
(WMO/TD No. 641) Report of the GCOS Space-based Observation Task Group (Darmstadt, Germany, May 3-6, 1994)
[ftp://www.wmo.ch/Documents/gcos/sotg.txt or /sotg.wp5]
- GCOS-8**
(WMO/TD No. 642)
(UNEP/EAP.MR/94-9) Report of the GCOS/GTOS Terrestrial Observation Panel, first session (Arlington, VA, USA, June 28-30, 1994)
[ftp://www.wmo.ch/Documents/gcos/top-1.txt or /top-1.wp5]
- GCOS-9**
(WMO/TD-No . 643) Report of the GCOS Working Group on Socio-economic Benefits, first session (Washington DC, USA, August 1-3, 1994)
[ftp://www.wmo.ch/Documents/gcos/wgsb-1.txt or /wgsb-1.wp5]
- GCOS-10**
(WMO/TD-No. 666) Summary of the GCOS Plan, Version 1.0, April 1995
[ftp://www.wmo.ch/Documents/gcos/gps-ver1.txt or /gps-ver1.wp5]
- GCOS-11**
(WMO/TD-No. 673) Report of the GCOS Data and Information Management Panel, first session (Washington DC, USA, February 7-10, 1995)
[ftp://www.wmo.ch/Documents/gcos/dimp-1.txt or /dimp-1.wp5]
- GCOS-12**
(WMO/TD-No . 674) The Socio-economic Benefits of Climate Forecasts: Literature Review and Recommendations (Report prepared by the GCOS Working Group on Socio-economic Benefits), April 1995
[ftp://www.wmo.ch/Documents/gcos/wgsb-1rr.txt or /wgsb-1rr.wp5]

- GCOS-13**
(WMO/TD-No. 677) GCOS Data and Information Management Plan, Version 1 .0,
April 1995
[ftp://www . wmo.ch/Documents/gcos/dp-ver 1. txt or /dp-ver 1. wp5]
- GCOS-14**
(WMO/TD-No. 68 1) Plan for the Global Climate Observing System (GCOS), Version 1 .0,
May 1995
[ftp://www . wmo.ch/Documents/gcos/gp-ver1 .txt or /gp-ver1 .wp5]
- GCOS-15**
(WMO/TD-No. 684) GCOS Plan for Space-based Observations, Version 1.0, June 1995
[ftp://www.wmo.ch/Documents/gcos/sp-ver 1. wp5]
(wp version only)
- GCOS-16**
(WMO/TD-No. 685) GCOS Guide to Satellite Instruments for Climate, June 1995
(will not be on FTP Server)
- GCOS-17**
(WMO/TD-No. 696) Report of the GCOS Atmospheric Observation Panel, second session
(Tokyo, Japan, March 20-23, 1995)
[ftp: //www . wmo.ch/Documents/gcos/aop-2. txt or /aop-2. wp5]
- GCOS-18**
(WMO/TD-No. 697) Report of the GCOS/GTOS Terrestrial Observation Panel, second
(UNEP/EAP.MR/95-10) session (London, UK, April 19-21, 1995)
[ftp://www.wmo.ch/Documents/gcos/top-2.txt or /top-2.wp5]
- GCOS-19**
(WMO/TD-No . 709) Report of the GCOS Data Centre Implementation/Co-ordination
Meeting (Offenbach, Germany, June 27-29, 1995)
[ftp://www.wmo.ch/Documents/gcos/dcc-1.txt or /dcc-1.wp5]
- GCOS-20**
(WMO/TD-No. 720) GCOS Observation Programme for Atmospheric Constituents:
Background, Status and Action Plan, September 1995
[ftp://www.wmo.ch/Documents/gcos/atmcons .txt or /atmcons.wp5]
- GCOS-21**
(WMO/TD-No. 721) GCOS/GTOS Plan for Terrestrial Climate-related Observations,
(UNEP/EAP. TR/95-07) version 1.0, November 1995
[ftp://www.wmo.ch/Documents/gcos/top-ver 1. wp5]
- GCOS-22**
(WMO/TD-No. 722) Report of the fifth session of the Joint Scientific and Technical
Committee for GCOS (Hakone, Japan, October 16-19, 1995)
[ftp://www.wmo.ch/Documents/gcos/jstc-5.wp5]
- GCOS-23**
(WMO/TD-No. 754) Report of the GCOS/GTOS Terrestrial Observation Panel for Climate,
(UNEP/DEIA/MR.96-6) third session (Cape Town, South Africa, March 19-22, 1996)
(FAO GTOS-1) [ftp://www.wmo.ch/Documents/gcos/top-3.wp5]

- GCOS-24** Report of the Joint **GCOS/GOOS/WCRP** Ocean Observations Panel for Climate, first session (Miami, Florida, USA, March 25-27, 1996) [ftp://www.wmo.ch/Documents/gcos/oopc-1.wp5]
(WMO/TD-No. 768)
(UNESCO/IOC)
- GCOS-25** Report of the GCOS Data and Information Management Panel, second session (Ottawa, Ontario, Canada, May 14-17, 1996) [ftp://www.wmo.ch/Documents/gcos/dimp-2.wp5]
(WMO/TD-No. 765)
(UNEP/DEIA/MR.96-5)
- GCOS-26** Report of the Joint **CCI/CBS** Expert Meeting on the GCOS Surface Network (Norwich, UK, March 25-27, 1996) [ftp://www.wmo.ch/Documents/gcos/cbs-1.wp5]
(WMO/TD-No. 766)
- GCOS-27** Report of the Expert Meeting on Hydrological Data for Global Observing Systems (Geneva, Switzerland, April 29-May 1, 1996) [ftp://www.wmo.ch/Documents/gcos/hwr-1.wp5]
(WMO/TD-No. 772)
(UNEP/DEIA/MR.96-7)
- GCOS-28** *In Situ* Observations for the Global Observing Systems (Geneva, Switzerland, September 10-13, 1996) [ftp://www.wmo.ch/Documents/gcos/insitu.wp5]
(WMO/TD-No. 793)
(UNEP/DEIA/MR.97-3)
- GCOS-29** Report of the Global Observing Systems Space Panel, second session (Geneva, Switzerland, October 16-18, 1996) [ftp://www.wmo.ch/Documents/gcos/gossp-2.wp5]
(WMO/TD-No. 794)
(UNEP/DEIA/MR.97-4)
- GCOS30** Report of the sixth session of the Joint Scientific and Technical Committee for GCOS (Victoria, British Columbia, Canada, October 28-November 1, 1996) [ftp://www.wmo.ch/Documents/gcos/jstc-6.wp5]
(WMO/TD-No. 795)
- GCOS31** Proceedings of the fifth meeting of the TAO Implementation Panel (TIP-5) (**Goa**, India, November 18-21, 1996)
- GCOS-32** **GCOS/GTOS** Plan for Terrestrial Climate-related Observations, version 2.0, June 1997 [ftp://www.wmo.ch/Documents/gcos/top-ver2.wp5]
(WMO/TD-No. 796)
- GCOS-33** **GHOST** - Global Hierarchical Observing Strategy, March 1997
(WMO/TD-No. 798)
- GCOS-34** Initial Selection of a GCOS Surface Network, February 1997 [ftp://www.wmo.ch/Documents/gcos/gsn-1.wp5]
(WMO/TD-No. 799)
- GCOS-35** Report of the second Joint **CCI/CBS** Meeting on the GCOS Surface Network (De Bilt, The Netherlands, June 25-27, 1997) [ftp://www.wmo.ch/Documents/gcos/cbs-2.wp5]
(WMO/TD-No. 839)